

METHOD OF DIVIDING A GUIDED ELECTROMAGNETIC SIGNAL INTO  
HALF-POWER SIGNALS, USING PHOTONIC CRYSTALS

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ABSTRACT

The invention relates to a method of dividing the power of an input electromagnetic signal into two equal-power signals with a relative phase difference therebetween  
10 of  $180^\circ$  and an equal propagation delay. The inventive method makes use of a photonic crystal coupler comprising two parallel guides which are disposed close to one another and which are based on coupled cavities. The method consists in exciting the odd mode of the coupler which,  
15 owing to the symmetry thereof, ensures that the field maxima coincide in one guide with the minima in the adjacent guide, thereby producing a relative phase difference of  $180^\circ$ . The two output signals are obtained through the spatial separation of the guides forming the  
20 coupler, making use of the property possessed by guides in photonic crystals for high transmission efficiency through very tight curves. In this way, the size of the structure can be reduced considerably. The inventive method can be used for both two-dimensional and three-dimensional  
25 photonic crystals.